

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES**

In Re Application of:)	
)	Confirmation No.: 2091
George C. Carver et al.)	
)	Group Art Unit: 3663
Serial No.: 10/795,879)	
)	Examiner: Mondt, Johannes P.
Filed: March 8, 2004)	
)	Docket No.: 061404-1100
For: Container and Method for Storing or)	
Transporting Spent Nuclear Fuel)	

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Appeal Brief is submitted in support of the Notice of Appeal filed September 25, 2009, responding to the final Office Action mailed June 25, 2009.

REAL PARTY IN INTEREST

The real party in interest of the instant application is NAC International, Inc., having its principal place of business at 3930 E. Jones Bridge Road, Norcross, GA 30092.

I. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

II. STATUS OF THE CLAIMS

Claims 1, 3-10, 13-34, 48-51, 53-58, and 69-71 are pending in this application. Claims 2, 11-12, 35-47, 52, and 59-68 were cancelled during prosecution. Claims 1, 3-10, 13-34, 48-51, 53-58, and 69-71 were rejected by the final Office Action, and are the subject of this appeal.

III. STATUS OF AMENDMENTS

There have been no claim amendments made after the final Office Action, and all amendments made before the final Office Action have been entered. The claim listing in section VII (CLAIMS – APPENDIX) represents the present state of the claims.

IV. SUMMARY OF THE CLAIMED SUBJECT MATTER

Embodiments of the claimed subject matter are summarized below with reference numbers and references to the written description (“specification”) and drawings. The subject matter described below appears in the original disclosure at least where indicated, and may further appear in other places within the original disclosure. Embodiments according to independent claim 1 involve a container for storing or transporting spent nuclear fuel (FIG. 1), the container comprising: a plurality of tubes that receive spent nuclear fuel assemblies (FIG. 1: 2, 4, 6, 7; ¶ 24), each tube having four sidewalls and four corners defining a rectangular cross section (FIG. 4: 2, 4, 6, 7), the four sidewalls forming a continuous inner sidewall (FIGS. 5 and 8: 2, 4); an attachment means for attaching respective pairs of a plurality of corners of the tubes to each other (FIG. 2: 8, 12, 16, 18; FIG. 6: 40; ¶ 28 and ¶ 44), at least one corner of a first one of the tubes engaging another corner of a second one of the tubes (FIG. 6; ¶ 44), the attachment means comprising a plurality of recesses in respective ones of the corners (FIG. 6: 32, 34; ¶ 44) and a plurality of rods that are positioned in the recesses between respective engaged ones of the corners (FIG. 6: 8, 12, 20, 22; ¶ 44), wherein each of the rods is a cylinder having a single cylindrical wall (¶ 25, lines 1-4), the cylindrical wall of each of the rods contacting at least two recesses associated with at least two of the tubes (FIG. 5: 8, 12, 32; ¶ 26; lines 9-10); each engaged corner of the first and second ones of the tubes being formed from an intersection of a first sidewall and a second sidewall, the first and second side walls being normal to each other (FIG. 5: 8, 12, 20, 22); the first sidewall of the first one of the tubes and the first sidewall of the second one of the tubes being in substantial alignment; and the

second sidewall of the first one of the tubes and the second sidewall of the second one of the tubes being in substantial alignment (FIGS. 6 and 7).

Embodiments according to independent claim 8 involve a container for storing or transporting spent nuclear fuel (FIG. 1), the container comprising: a plurality of tubes that receive spent nuclear fuel (FIG. 1: 2, 4, 6, 7; ¶ 24), each of the plurality of tubes having a continuous inner sidewall (FIGS. 5 and 8: 2, 4); a plurality of first rods being mounted at a point where each respective one of the tubes abuts against another one of the tubes (FIG. 2), each of said first rods having an opening (FIG. 5: 8, 12, 20, 22), wherein each respective one of the first rods is mounted in a recess of both a first one of the tubes and a second one of the tubes (FIG. 5: 8, 12, 32; ¶ 26; lines 9-10), wherein each of the rods comprises at least one outer wall, the at least one outer wall of each of the rods contacting the recesses of both the first and second ones of the tubes (FIG. 5: 8, 12, 32; ¶ 26; lines 9-10); at least one pin (FIG. 6: 40); wherein the openings of respective ones of the first rods mounted on the first one of the tubes are substantially aligned with the openings of respective ones of the first rods mounted on the second one of the tubes (FIGS. 6 and 7); the at least one pin extends through the aligned ones of the openings of the first rods, thereby linking respective ones of the tubes together (FIG. 6: 40; FIG. 7: 50; ¶ 44; ¶ 45); and wherein each one of the respective ones of the first rods mate with a corresponding recess in the second one of the tubes when the openings of the respective ones of the first rods mounted in the recesses in the first one of the tubes are substantially aligned with the openings of the respective ones of the first rods mounted on the second one of the tubes (FIG. 5; ¶ 37).

Embodiments according to independent claim 18 involve a container for storing spent nuclear fuel (FIG. 1), the container comprising a plurality of tubes that receive spent nuclear fuel assemblies (FIG. 1: 2, 4, 6, 7; ¶ 24), each of the tubes having a plurality of recesses (FIG. 5: 32, 34) and a continuous inner sidewall (FIGS. 5 and 8: 2, 4); a plurality of first rods being mounted in respective ones of the recesses (FIG. 5: 8, 12, 32; ¶ 26; lines 9-10); and wherein at least one

first rod mounted on a respective one of the tubes is attached to at least one of the first rods mounted on at least one second one of the tubes, thereby linking the respective one of the tubes and the at least one second one of the tubes together (FIG. 6: 40; FIG. 7: 50; ¶ 44; ¶ 45), wherein each of the first rods is seated in both a first one of the recesses of the respective one of the tubes and a second one of the recesses of the at least one second one of the tubes (FIG. 5; ¶ 37), and each of the rods comprises at least one outer wall, the at least one outer wall of each of the rods contacting both the first and second ones of the recesses (FIG. 5: 8, 12, 32; ¶ 26; lines 9-10).

Embodiments of independent claim 28 involve a container for storing or transporting spent nuclear fuel (FIG. 1), the container comprising: a plurality of tubes that receive spent nuclear fuel rods (FIG. 1: 2, 4, 6, 7; ¶ 24), each of the tubes having four sidewalls forming a continuous inner sidewall (FIGS. 5 and 8: 2, 4) and four corners defining a rectangular cross section (FIG. 4: 2, 4, 6, 7), each of the tubes having a plurality of recesses along at least one of the corners (FIG. 5: 32, 34) and a plurality of flat load bearing surfaces along at least one of the corners (FIG. 8: 60, 62); a plurality of first rods being mounted in the recesses of the tubes (FIG. 2), wherein respective pairs of the first rods are attached to each other, thereby linking the tubes together (FIG. 6: 40; FIG. 7: 50; ¶ 44; ¶ 45), and each of the first rods is seated in the recesses of two of the tubes (FIG. 5; ¶ 37), wherein each of the rods comprises at least one outer wall, the at least one outer wall of each of the rods contacting the recesses of two of the tubes (FIG. 5: 8, 12, 32; ¶ 26; lines 9-10); and wherein the tubes are linked to each other at the corners such that the flat load bearing surfaces on respective pairs of the tubes abut against each other (FIG. 8: 60, 62; ¶ 47-48).

Embodiments of independent claim 48 involve an apparatus for the storage and transport of spent nuclear fuel (FIG. 1), comprising: an array of tubes having a continuous inner sidewall (FIGS. 5 and 8: 2, 4); a container, wherein the array of tubes are disposed in the container and the array of tubes contacts at least one side wall of the container (FIG. 1: 10); a

plurality of couplings between adjacent pairs of the tubes (FIG. 2: 8, 12, 16, 18; FIG. 6: 40; ¶ 28 and ¶ 44), wherein each of the couplings comprises: a first rod disposed on a first one of the tubes (FIG. 5: 8); a second rod attached to a second one of the tubes (FIG. 5: 20); the first rod being disposed in recesses formed in the outer surfaces of both the first and second ones of the tubes (FIG. 5: 8, 32, 34), and the second rod being disposed in the recesses formed in the outer surfaces of both the first and second ones of the tubes (FIG. 5: 20, 32, 34), wherein each of the first and second rods comprises at least one outer wall, the at least one outer wall of each of the first and second rods contacting the recesses formed in the outer surfaces of both the first and second ones of the tubes (FIG. 5: 8, 12, 32; ¶ 26; lines 9-10); the first and second rods each having an opening along a length of the first and second rods (FIG. 6: 8, 12; ¶ 44); and a pin extending through the openings of the first and second rods (FIG. 6: 40; ¶ 44); and wherein a horizontal bearing load applied to the array of tubes is transferred through the tubes and the couplings to the at least one side wall of the container (¶ 46 – ¶ 48).

Embodiments of independent claim 69 involve an apparatus for the dry storage and transport of spent nuclear fuel (FIG. 1; ¶ 23), comprising: a plurality of tubes disposed in a container (FIG. 1: 2, 4, 6, 7; ¶ 24), each of the plurality of tubes having a continuous inner sidewall (FIGS. 5 and 8: 2, 4); a plurality of recesses, each recess being formed in a wall of a respective one of the tubes (FIG. 5: 32, 34, ¶ 37); a plurality of rods, each rod being disposed within a first one of the recesses formed in a first one of the tubes (FIG. 5: 8, 20, 32, 34); each of the rods has an outer wall that contacts a second one of recesses formed in a second one of the tubes when the tubes are assembled in the container (FIG. 5: 8, 20, 32, 34); and each of the recesses being configured to receive the rod from a lateral direction with respect to a longitudinal length of a respective one of the tubes to facilitate a horizontal assembly of the tubes to each other (FIG. 5: 8, 20, 32, 34; ¶ 37).

V. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The following grounds of rejection are to be reviewed on appeal.

- A. Claims 7, 17, 27, 28 and 50 stand rejected under 35 U.S.C. § 112, first paragraph, for allegedly failing to comply with the enablement requirement.
- B. Claims 1, 3-10, 13-34, 48-51, 53-58, and 69-71 stand rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement.
- C. Claims 7, 17, 27, 28 and 50 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regard as the invention.
- D. Claims 1, 3-10, 13-34, 48-51, 53-58, and 69-71 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regard as the invention.

VI. ARGUMENT

A. Rejection of claim 7, 17, 27, 28 and 50 under 35 U.S.C. § 112, first paragraph

The Office Action rejected claims 7, 17, 27, 28, and 50 for allegedly failing to comply with the enablement requirement under 35 U.S.C. § 112, first paragraph. The Office Action alleges in item 12 that the above claims contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention. Additionally, the Office Action alleges that the claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. The Office Action further alleges in item 12 that the reasoning for this rejection “is the same as discussed in sections 6 and 9 of this Office Action and the same as reason of the drawing and the specification objection.” Accordingly, Appellant submits that resolutions of the claim rejections made in the final Office Action under 35 U.S.C. § 112 will

render these objections moot. These claim objections, for the purposes of discussing the claim rejections under 35 U.S.C. § 112, are discussed in the following

Item 6 of the Office Action alleges:

6. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the limitation of claim 7, "the plurality of tubes includes a plurality of flat load bearing surfaces at the corners of respective ones of the tubes, the flat load bearing surfaces of the first one of the tubes engaging the plurality of flat bearing surfaces on the second one of the tubes" must be shown or the features canceled from the claims (see claims 7, 17, 27, 28 and 50). Regarding said limitation: as can be seen in FIG. 5, connection of rod 8, 12 with rod 20, 22 by pin cannot connect flat bearing surfaces of corners 60 and 62 together as claimed in claims 7, 17, 27 and 28 and as shown in FIG. 9. The apparatus as shown in FIG. 5 cannot operate as shown in FIG. 8, 9 as disclosed in Specification and as claimed. The reason of said controversies is not a scale of the drawing 5, as Applicant argued on page 20, but a principally difference (*sic*) in attachment configurations as shown in FIG. 5 and as disclosed in specification and as claimed. Ordinary skill in the art cannot to (*sic*) build or use invention as claimed with using of the principally incorrect Drawing 5 because this drawing drawn to the principally different embodiment of the container with a possibility of tubs rotation around the pin as with an obvious hinge attachment.

Appellants respectfully disagree. Appellants respectfully submit that the test for enablement is stated in MPEP 2164.01, which provides:

The standard for determining whether the specification meets the enablement requirement was cast in the Supreme Court decision of *Mineral Separation v. Hyde*, 242 U.S. 261, 270 (1916) which postured the question: is the experimentation needed to practice the invention undue or unreasonable?

Appellants submit that the final Office Action failed to apply this test or including any discussion regarding whether an undue level of experimentation is needed in the instant case. Specifically, FIGS. 8 and 9 show how flat load bearing surfaces come together at corners of the respective ones of the tubes. To the extent that such a configuration appears to be incompatible with the use of the pins or rods as described in the Office Action as set forth above, Appellants respectfully assert that the drawings illustrate the ***principle of flat surfaces coming together***. It is understood that the drawings of the rods and recesses as set forth in

FIG. 5 are not necessarily to scale. To this end, reference is made to paragraph [0012] of the present specification which states:

The disclosed apparatus and methods can be better understood with reference to the following drawings. The components in the drawings are not necessarily to scale.

Accordingly, the drawings of the present application are provided to illustrate the various aspects of the claimed embodiments, but are not working drawings that provide specific dimensions of the components displayed. To this end, drawings in patent applications are not working drawings, but instead generally describe the principles illustrated therein. Accordingly, it is improper to base arguments upon visual measurement of the drawings relative to each other. See *In re Wright*, 193 USPQ 332 (CCPA 1977); *In re Chitayat*, 408 F2d 475, 161 USPQ 224 (CCPA 1969).

Appellants assert that it appears that the Office Action has recited the objection to the drawings with respect to claims 7, 17, 27, 28 and 50 by performing a visual comparison of the drawings as if they relayed precise measurements of the components described. Appellants respectfully assert that such a comparison is improper. Further, Appellants assert that one skilled in the art will understand that the various components will be sized such that flat load bearing surfaces at the corners may come together and that the same corners may also accommodate recesses and rods as described herein.

To this end, one skilled in the art understands that the flat load bearing surfaces are ***longitudinally offset*** with respect to the recesses and rods. In other words, the flat load bearing surfaces are located at a different altitude than the recesses and rods. Stated yet another way, the rods and recesses illustrated in FIG. 5 would be located either above or below the flat load bearing surfaces illustrated in FIGS. 8 and 9. Accordingly, in one embodiment, the flat load bearing surfaces can extend horizontally outwards relative to the rods and recesses in order to allow the surfaces to come together. In making its rejection, the final Office Action

assumes that the flat load bearing surfaces of FIG. 5 and the rods and recesses of FIGS. 8 and 9 are disposed in the same vertical position of a sidewall of an embodiment of the disclosure. As one non-limiting example, Appellants' specification describes one embodiment in FIG. 2 of the disclosure, which describes an embodiment wherein recesses and rods are disposed at top and bottom corners of a tube. Accordingly, in such an embodiment, flat load bearing surfaces of adjacent tubes can exist in the remainder of the tube. See paragraph [0028].

Furthermore, the discussion of FIGS. 8 and 9 describes bringing the flat load bearing surfaces together when the respective tubes are "linked together," which refers to the fact that such tubes are connected by virtue of the rods and pins as described therein. Additionally, paragraph [0047] of the present specification also states that the tubes depicted in the drawing of FIG. 8 are not depicted adjacent to each other "***to better illustrate the flat bearing surfaces 60, 62.***" In other words, FIG. 8 depicts the tubes not adjacent to each other, and then FIG. 9 depicts the same tubes configured as recited in claim 1. This discussion from Appellants' specification reinforces the proposition that the drawings are for the benefit of a person of ordinary skill in the art and are not meant as construction blueprints or schematics. Accordingly, Appellants assert that it is clearly apparent to one skilled in the art that the rod and pin linkages maintain the load bearing surfaces on abutting tube corners in the appropriate geometric positions for interaction.

With respect to item 9 of the final Office Action, which is referenced by the rejection of the claims under 35 U.S.C. § 112, the Office Action states as follows:

The specification is objected to because the limitation of claims 7, 17, 27, 28 and 50 "the plurality of tubes includes a plurality of flat load bearing surfaces at the corners of respective ones of the tubes, the flat load bearing surfaces on the first one of the tubes engaging the plurality of flat bearing surfaces on the second one of the tubes" must be disclosed with recitation of drawing's position or the features canceled from the claims (see claims 7, 17, 27, 28 and 50). As can be seen in FIG. 5, connection of rod 8, 12 with rod 20, 22 by pin cannot connect flat bearing surfaces of corners 60 and 62 together as claimed in claims 7, 17, 27 and 28 and as shown in FIG. 9. No new matter should be entered.

Appellants respectfully disagree. Once again, the drawings of the present patent application are not working drawings, but are merely providing illustrations of the various concepts of the present applications. Therefore, the visual comparison made between FIG. 5 and FIGS. 8 and 9 in order to determine whether a pin can fit in recesses of the corners as shown is entirely improper. This reflects the fact that patent drawings generally provide illustration of the various concepts and are not working drawings with precise measurements. *In re Wright*, 193 USPQ 332 (CCPA 1977); *In re Chitayat*, 408 F2d 475, 161 USPQ 224 (CCPA 1969).

Appellants assert that one skilled in the art understands that the various components are sized such that flat load bearing surfaces at the corners may come together and that the same corners may also accommodate recesses and rods as described herein. To this end, one skilled in the art understands that the flat load bearing surfaces are longitudinally offset with respect to the recesses and rods. Stated another way, it is clearly apparent to one skilled in the art that the pin and rod linkages maintain the load bearing surfaces on abutting tube corners in the appropriate geometric positions for interaction.

Accordingly, Appellants respectfully assert that the rejection of claims 7, 17, 27, 28 and 50 under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the enablement requirement is improper. Therefore, Appellants respectfully request that the rejection of these claims be overturned.

B. Rejection of claims 1, 3-10, 13-34, 48-51, 53-58, and 69-71 under 35 U.S.C. § 112, first paragraph

Claims 1, 3-10, 13-34, 48-51, 53-58, and 69-71 stand rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. The basis for this rejection, as alleged by the final Office Action in item 13, is same as discussed in

items 7 and 10 of the Office Action, which set forth objections to the claims and the specification, respectively.

Item 7 of the Office Action alleges that the claim limitation “cylindrical wall must be shown by reference number on the drawings or the features cancelled from the claims.” There is no rationale, statutory support or case law support provided by the Office Action to advance this proposition. Appellant respectfully submits that this claim rejection, which was made under 35 USC 112, bears no relation to any requirement located in 35 USC 112 or the interpretation of 35 USC 112 set forth in the MPEP. 35 USC 113 states that the applicant shall furnish drawings where necessary for the understanding of the subject matter to be patented. Appellant has duly obliged this provision of the United States Code and provided a set of drawings with the originally filed application. However, Appellant has been unable to locate any statutory provision or rule promulgated by the USPTO that requires that a claim limitation be shown by reference number on the drawings or else cancelled from the claims. Appellant respectfully submits that no such requirement exists, and that the rejection should be overturned.

Item 10 of the Office Action likewise sets forth an objection to the specification on which the above claim rejection is based. Item 10 objects to the specification as allegedly failing to comply with the enablement requirement of 35 USC 112. The Office Action alleges that the term “cylindrical wall must be shown by reference number on the drawings or the features should be cancelled from the claims.” As set forth above, Appellants respectfully submit that no such requirement exists, and that the rejection should be overturned.

Additionally, the Office Action, in item 14, alleges that claims 1, 3-10, 13-34, 48-51, 53-58 and 69-71 are also rejected under 35 USC 112 for the same reasons as set forth in the claim objections described in items 8 and 11 of the Office Action. Items 8 and 11 object to the drawings and specification, respectively, as failing to comply with the enablement requirement of 35 USC 112. The Office Action maintains a separate basis for rejecting these claims under

35 USC 112, first paragraph by alleging that according to FIG. 5, the disclosed rods are not contacted with at least two of the tubes. Appellant respectfully disagrees.

FIG. 1 and the exploded cross sectional view of FIG. 4, as well as the corresponding discussion in the specification, illustrate tubes 2, 4 having rods contacted with at least two adjacent tubes. It is noted in the specification that the tubes are shown as not adjacent to each other for illustrative purposes. See paragraph [0037]. Paragraph [0024] of the specification also notes that “tubes can be arranged in other geometric shapes, e.g., circle, triangle, heptagon, hexagon and octagon.” Accordingly, Appellant submits that it should be appreciated that the tubes recited by the pending claims can include rods and can contact any number of recesses associated with other tubes. Once again, the drawings of the present patent application are not working drawings, but are merely providing illustrations of the various concepts of the present applications. Therefore, the visual comparison made between FIGS. 1 and 4 is entirely improper. Appellants assert that one skilled in the art understands that the various components are sized such that flat load bearing surfaces at the corners may come together and that the same corners may also accommodate recesses and rods as described herein.

C. Rejection of claims 7, 17, 27, 28 and 50 under 35 U.S.C. § 112, second paragraph

In item 15, the Office Action rejects claims 7, 17, 27, 28 and 50 under 35 USC 112, second paragraph, as being allegedly indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Office Action rejects the claims on the same basis as noted above with respect to claims 7, 17, 27, 28 and 50 in item VI(A) herein. Accordingly, Appellant submits that the rejection is misplaced at least for the same reasons as noted above with respect these claims in item VI(A). Therefore, Appellant respectfully requests that the rejection be overturned

D. Rejection of claims 1, 3-10, 13-34, 48-51, 53-58, and 69-71 under 35 U.S.C. § 112, first paragraph

In items 16 and 17, the Office Action rejects claims 1, 3-10, 13-34, 48-51, 53-58, and 69-71 under 35 USC 112, second paragraph, as being allegedly indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Office Action rejects the claims on the same basis as noted above with respect to claims 1, 3-10, 13-34, 48-51, 53-58, and 69-71 in item VI(B) herein. Accordingly, Appellant submits that the rejection is misplaced at least for the same reasons as noted above with respect these claims in item VI(B). Therefore, Appellant respectfully requests that the rejection be overturned

CONCLUSION

For at least the reasons discussed above, Appellant respectfully requests that the Examiner's final rejection of claims 1, 3-10, 13-34, 48-51, 53-58, and 69-71 be overturned by the Board. In addition to the claims listed in Section VII (CLAIMS – APPENDIX), Section VIII (EVIDENCE – APPENDIX) included herein indicates that there is no additional evidence relied upon by this brief. Section IX (RELATED PROCEEDINGS – APPENDIX) included herein indicates that there are no related proceedings.

Respectfully submitted,

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VII. CLAIMS – APPENDIX

1. A container for storing or transporting spent nuclear fuel, the container comprising:
 - a plurality of tubes that receive spent nuclear fuel assemblies, each tube having four sidewalls and four corners defining a rectangular cross section, the four sidewalls forming a continuous inner sidewall;
 - an attachment means for attaching respective pairs of a plurality of corners of the tubes to each other, at least one corner of a first one of the tubes engaging another corner of a second one of the tubes, the attachment means comprising a plurality of recesses in respective ones of the corners and a plurality of rods that are positioned in the recesses between respective engaged ones of the corners, wherein each of the rods is a cylinder having a single cylindrical wall, the cylindrical wall of each of the rods contacting at least two recesses associated with at least two of the tubes;
 - each engaged corner of the first and second ones of the tubes being formed from an intersection of a first sidewall and a second sidewall, the first and second side walls being normal to each other;
 - the first sidewall of the first one of the tubes and the first sidewall of the second one of the tubes being in substantial alignment; and the second sidewall of the first one of the tubes and the second sidewall of the second one of the tubes being in substantial alignment.
3. The container of claim 1, wherein each of the first rods has an opening and the attachment means further comprises at least one pin, wherein the openings of at least one respective pair of the first rods mounted in respective ones of the recesses of the first and second ones of the tubes are axially aligned, wherein the at least one pin is inserted through the openings of the at least one respective pair of the first rods.

4. The container of claim 1, wherein the rods further comprise at least one first rod and at least one second rod, the at least one first rod being mounted in a corresponding at least one of the recesses of the first one of the tubes and the at least one second rod being mounted in a corresponding at least one of the recesses of the second one of the tubes, the at least one first rod engaging a respective one of the recesses of the second one of the tubes and the at least one second rod engaging a respective one of the recesses of the first one of the tubes when the first side wall of the first one of the tubes and the first side wall of the second one of the tubes are in substantial alignment, and the second side wall of the first one of the tubes and the second side wall of the second one of the tubes are in substantial alignment.

5. The container of claim 4, further comprising a first and a second set of the tubes, wherein the second rods are mounted on the tubes within the first set, wherein each of the second rods of the first set of tubes engages a respective one of the tubes in the second set of tubes.

6. The container of claim 1, wherein the plurality of tubes is arranged in the alternating pattern such that the placement of a four-tube array linked at the corners of the tubes creates a developed cell.

7. The container of claim 1, wherein the plurality of tubes includes a plurality of flat load bearing surfaces at the corners of respective ones of the tubes, the flat load bearing surfaces on the first one of the tubes engaging the plurality of flat bearing surfaces on the second one of the tubes.

8. A container for storing or transporting spent nuclear fuel, the container comprising:
- a plurality of tubes that receive spent nuclear fuel, each of the plurality of tubes having a continuous inner sidewall;
 - a plurality of first rods being mounted at a point where each respective one of the tubes abuts against another one of the tubes, each of said first rods having an opening, wherein each respective one of the first rods is mounted in a recess of both a first one of the tubes and a second one of the tubes, wherein each of the rods comprises at least one outer wall, the at least one outer wall of each of the rods contacting the recesses of both the first and second ones of the tubes;
 - at least one pin;
 - wherein the openings of respective ones of the first rods mounted on the first one of the tubes are substantially aligned with the openings of respective ones of the first rods mounted on the second one of the tubes;
 - the at least one pin extends through the aligned ones of the openings of the first rods, thereby linking respective ones of the tubes together; and
 - wherein each one of the respective ones of the first rods mate with a corresponding recess in the second one of the tubes when the openings of the respective ones of the first rods mounted in the recesses in the first one of the tubes are substantially aligned with the openings of the respective ones of the first rods mounted on the second one of the tubes.

9. The container of claim 8, wherein the at least one pin is captured by one of the first rods.

10. The container of claim 8, wherein the at least one pin comprises a head portion and a body portion, the body portion extending through the openings of the aligned ones of the first rods and the head portion resting against one of the first rods.

13. The container of claim 8, further comprising a first set of tubes upon which the second rods are mounted, and a second set of tubes without second rods mounted thereon, the second rods of the first set of tubes engaging the second set of tubes when the tubes are linked together.

14. The container of claim 8, wherein each of the tubes has four sidewalls and four corners defining a rectangular cross section, the plurality of recesses being formed at the corners of the tubes.

15. The container of claim 14, wherein:
the tubes are arranged in an alternating pattern; and
the tubes are linked together at the corners, wherein a sidewall of a first one of the tubes is in substantial alignment with a sidewall of a second one of the tubes.

16. The container of claim 15, wherein the tubes are arranged in the alternating pattern such that the placement of a four-tube array linked at the corners of the tubes creates a developed cell.

17. The container of claim 15, wherein respective ones of the tubes includes a plurality of flat load bearing surfaces, the flat load bearing surfaces being located at the corners of the tubes, the flat load bearing surfaces on a respective one of the tubes engaging the flat load bearing surfaces on another one of the tubes.

18. A container for storing spent nuclear fuel, the container comprising:
a plurality of tubes that receive spent nuclear fuel assemblies, each of the tubes having a plurality of recesses and a continuous inner sidewall;
a plurality of first rods being mounted in respective ones of the recesses; and
wherein at least one first rod mounted on a respective one of the tubes is attached to at least one of the first rods mounted on at least one second one of the tubes, thereby linking the respective one of the tubes and the at least one second one of the tubes together, wherein each of the first rods is seated in both a first one of the recesses of the respective one of the tubes and a second one of the recesses of the at least one second one of the tubes, and each of the rods comprises at least one outer wall, the at least one outer wall of each of the rods contacting both the first and second ones of the recesses.

19. The container of claim 18, wherein each of the first rods has an opening and respective pairs of the first rods are attached to each other by axially aligning the openings of the respective pairs of the first rods and extending a pin through the openings of each of the respective pairs of the first rods.

20. The container of claim 19, wherein the pin comprises a head portion and a body portion, the body portion extending through the openings of each of the respective pairs of the first rods and the head portion abutting against one of the first rods.

21. The container of claim 19, wherein the pin is captured by one of the first rods.

22. The container of claim 18, wherein each of the tubes has four sidewalls and four corners defining a rectangular cross section, the recesses being formed along at least one of the corners of the tubes and the first rods being mounted in the plurality of recesses along the at least one of the corners of the tubes.

23. The container of claim 22, wherein the tubes are arranged in an alternating pattern and the tubes are linked together at the corners, wherein a first one of the side walls of the first one of the tubes is substantially aligned with a first one of the side walls of the second one of the tubes, and a second one of the side walls of the first one of the tubes is substantially aligned with a second one of the side walls of the second one of the tubes.

24. The container of claim 18, further comprising at least one second rod being mounted in the recesses of respective ones of the tubes, the at least one second rod mounted in the recess of a respective one of the tubes engaging the recess of a remaining one of tubes when the tubes are linked together.

25. The container of claim 24, wherein the plurality of tubes comprises a first set of tubes and a second set of tubes, wherein the second rods are mounted in each one of the tubes in the second set of tubes.

26. The container of claim 23, wherein the plurality of tubes is arranged in the alternating pattern such that the placement of a four-tube array linked at the corners of the tubes creates a developed cell.

27. The container of claim 22, wherein respective ones of the tubes includes a plurality of flat load bearing surfaces at the corners of the tubes, the plurality of flat load bearing surfaces on a respective one of the tubes engaging the flat bearing surfaces on a remaining one of the tubes.

28. A container for storing or transporting spent nuclear fuel, the container comprising:

a plurality of tubes that receive spent nuclear fuel rods, each of the tubes having four sidewalls forming a continuous inner sidewall and four corners defining a rectangular cross section, each of the tubes having a plurality of recesses along at least one of the corners and a plurality of flat load bearing surfaces along at least one of the corners;

a plurality of first rods being mounted in the recesses of the tubes, wherein respective pairs of the first rods are attached to each other, thereby linking the tubes together, and each of the first rods is seated in the recesses of two of the tubes, wherein each of the rods comprises at least one outer wall, the at least one outer wall of each of the rods contacting the recesses of two of the tubes; and

wherein the tubes are linked to each other at the corners such that the flat load bearing surfaces on respective pairs of the tubes abut against each other.

29. The container of claim 28, wherein each of the first rods includes an opening, wherein the openings of respective pairs of the first rods of adjacent ones of the tubes are aligned so that a pin may be extended therethrough, thereby attaching the respective pairs of the first rods together.

30. The container of claim 29, wherein the one or more pins comprise a head portion and a body portion, the body portion extending through the openings of the aligned first rods of adjacent tubes and the head portion being adjacent to one first rod of the plurality of first rods.

31. The container of claim 28, further comprising at least one second rod being mounted in the recesses of a respective one of the tubes and engaging the recesses of an adjacent one of the tubes when the tubes are linked together.

32. The container of claim 31, further comprising a first set of the tubes and a second set of the tubes, wherein the second rods are mounted in each one of the first set of tubes.

33. The container of claim 28, wherein the plurality of tubes is arranged in the alternating pattern such that the placement of a four-tube array linked at the corners of the tubes creates a developed cell.

34. The container of claim 29, wherein the pin is captured by one of the first rods.

48. An apparatus for the storage and transport of spent nuclear fuel, comprising:

- an array of tubes having a continuous inner sidewall;
- a container, wherein the array of tubes are disposed in the container and the array of tubes contacts at least one side wall of the container;
- a plurality of couplings between adjacent pairs of the tubes, wherein each of the couplings comprises:
 - a first rod disposed on a first one of the tubes;
 - a second rod attached to a second one of the tubes;
 - the first rod being disposed in recesses formed in the outer surfaces of both the first and second ones of the tubes, and the second rod being disposed in the recesses formed in the outer surfaces of both the first and second ones of the tubes, wherein each of the first and second rods comprises at least one outer wall, the at least one outer wall of each of the first and second rods contacting the recesses formed in the outer surfaces of both the first and second ones of the tubes;
 - the first and second rods each having an opening along a length of the first and second rods; and
 - a pin extending through the openings of the first and second rods; and
- wherein a horizontal bearing load applied to the array of tubes is transferred through the tubes and the couplings to the at least one side wall of the container.

49. The apparatus of claim 48, wherein each of the tubes further comprises a plurality of side walls, wherein at least one of the side walls of a respective one of the tubes and a side wall of a second one of the tubes are in substantial alignment.

50. The apparatus of claim 48, wherein each of the tubes in the adjacent pairs of tubes further comprise at least two side walls joined along a corner, and, a flat bearing surface disposed in at least a portion of the corner, wherein for each of the adjacent pairs of tubes, a first one of the flat bearing surfaces contacts a second one of the flat bearing surfaces.

51. The apparatus of claim 48, further comprising at least one solid rod disposed between the adjacent pairs of the tubes.

53. The apparatus of claim 48, wherein the first and second rods are welded into the recesses.

54. The apparatus of claim 48, wherein the recesses are formed in a plurality of corners in the outer surfaces of the tubes.

55. The apparatus of claim 48, wherein the pin extending through the openings of the first and second rods is rigidly attached to at least one of the first and second rods.

56. The apparatus of claim 55, wherein the pin is rigidly attached to at least one of the first and second rods by a weld, wherein the weld is positioned so as not to be subject to the horizontal bearing load.

57. The apparatus of claim 48, wherein a cross sectional shape of the tubes is selected from the group consisting of a square, a rectangle, a circle, a triangle, a hexagon, a heptagon, and an octagon.

58. The apparatus of claim 48, wherein the array of tubes forms a cell, wherein the tubes are arranged in an alternating pattern in the cell.

69. An apparatus for the dry storage and transport of spent nuclear fuel, comprising:
a plurality of tubes disposed in a container, each of the plurality of tubes having a continuous inner sidewall;
a plurality of recesses, each recess being formed in a wall of a respective one of the tubes;
a plurality of rods, each rod being disposed within a first one of the recesses formed in a first one of the tubes;
each of the rods has an outer wall that contacts a second one of recesses formed in a second one of the tubes when the tubes are assembled in the container; and
each of the recesses being configured to receive the rod from a lateral direction with respect to a longitudinal length of a respective one of the tubes to facilitate a horizontal assembly of the tubes to each other.

70. The apparatus of claim 69, further comprising:
respective ones of the rods being attached to corresponding ones of the recesses;
a plurality of pins; and
where the respective ones of the rods further comprise a socket to receive one of the pins.

71. The apparatus of claim 71, further comprising each of the pins being disposed into a pair of the sockets to connect a respective pair of the tubes.

VIII. EVIDENCE – APPENDIX

None.

IX. RELATED PROCEEDINGS – APPENDIX

None.